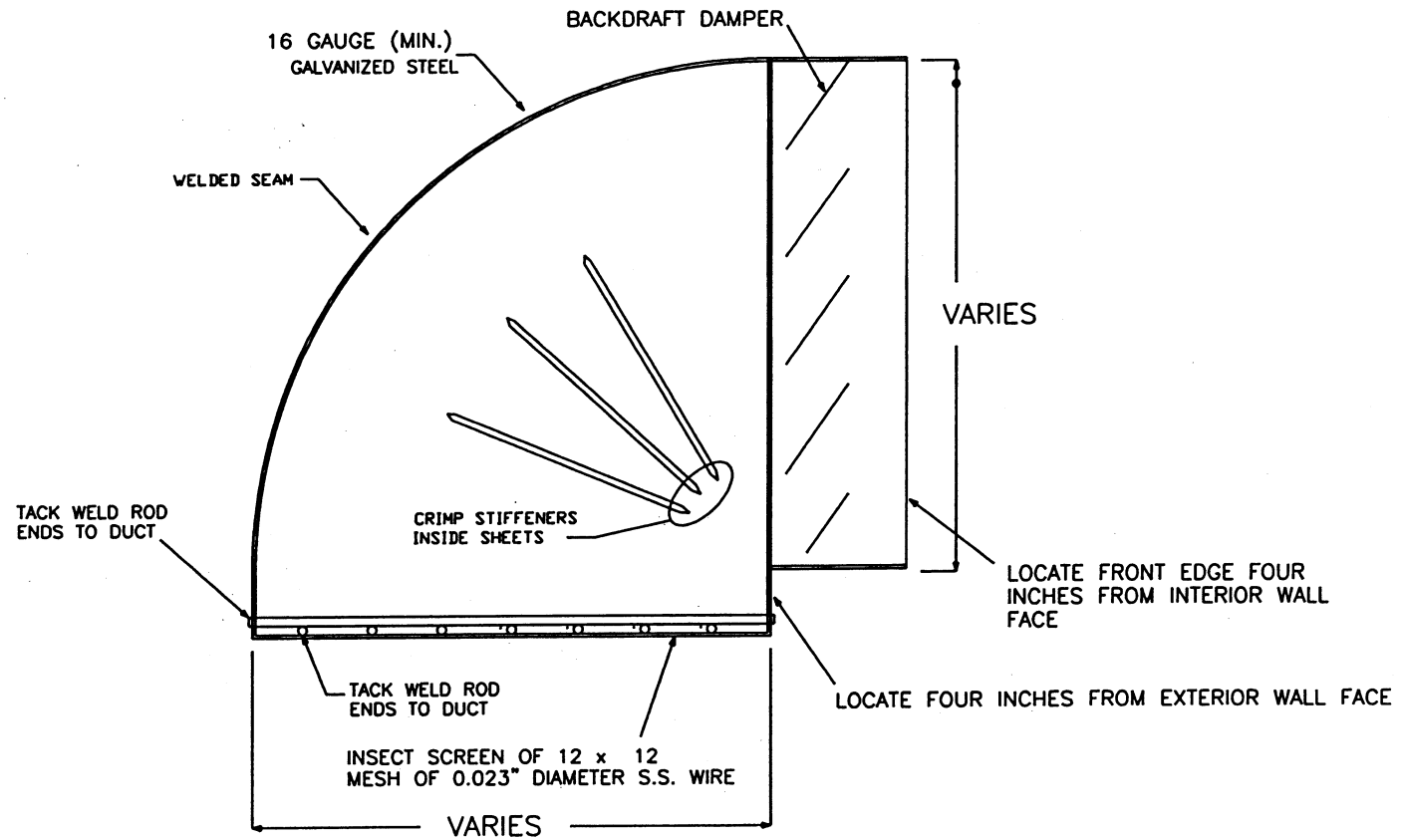
MECHANICAL ATTACHMENTS

ITEM #2

LEGACY ACE REGIONAL ENGINE GENERATOR PROJECTS FOR AML Octobet 17, 2006 VENTILATION SYSTEMS												
No.	Location	Clin No.	E/G Model Number	Size	Fuel Type	Vent & Comb Air (scfm)	Ruskin Intake Louver	Intake Quantity & Size (wxh)	In. Damper Quantity & Size (wxh)	Filter Quantify & Size	Exhaust Backdraft Damper	Exhaust Hood
1	ICT RCL	101.5	20RZ	10 kW	P	3658	EME520DD	(1) 28" x 75"	(1) 28" x 75"	(6) 25" x 14"	(1) 48"x 48"	(1) 48"x 48"
2	ICT RTRA	103.5	35RZG	15 kW	P	7628	EME520DD	(2) 28" x 75"	(2) 28" x 75"	(12) 25" x 14"	(1) 48"x 48"	(1) 48"x 48"
3	ICT RTRB	103.5	35RZG	15 kW	P	7628	EME520DD	(2) 28" x 75"	(2) 28" x 75"	(12) 25" x 14"	(1) 48"x 48"	(1) 48"x 48"
4	ICT RTRD	421	20REOZJB	20 kW	D	3311	EME520DD	(1) 28" x 75"	(1) 28" x 75"	(6) 25" x 14"	(1) 48"x 48"	(1) 48"x 48"
5												
6												
7												
8												
9												

Louvers are Ruskin Brand
w = width
h = height
scfm = standard cubic feet per minute
" = inches
Filters are based on Farr Aeropleat III, 2-inch medium efficiency pleated filters.
All new intake dampers shall have electric actuators and shall open upon e/g activation or on thermostat signal.
All motorized dampers shall fail open.

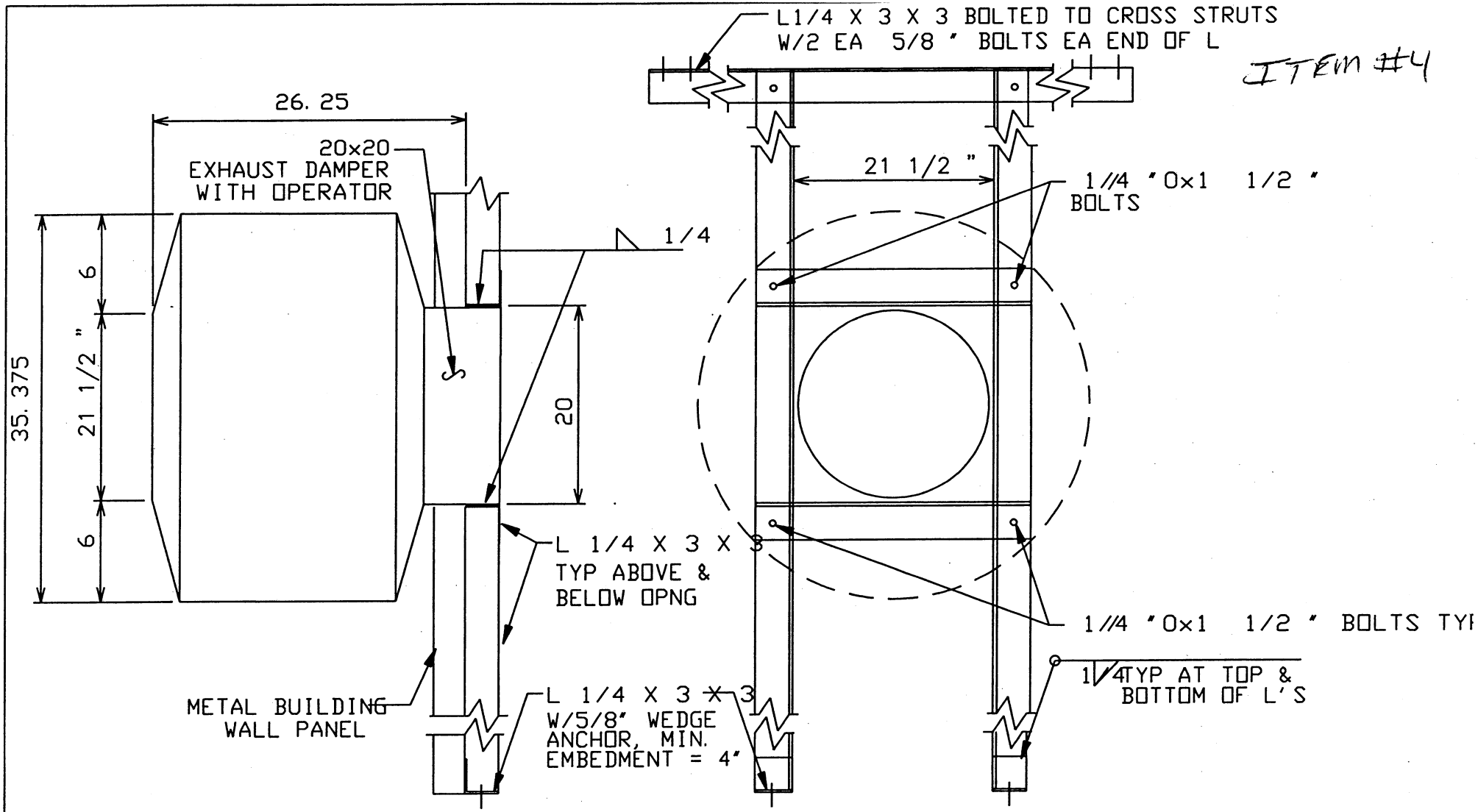
Item #3



EXHAUST HOOD DETAIL

NOT TO SCALE

...\Exhaust Hood.dwg 01/30/2007 11:14:13 AM



FAN SUPPORT DETAIL

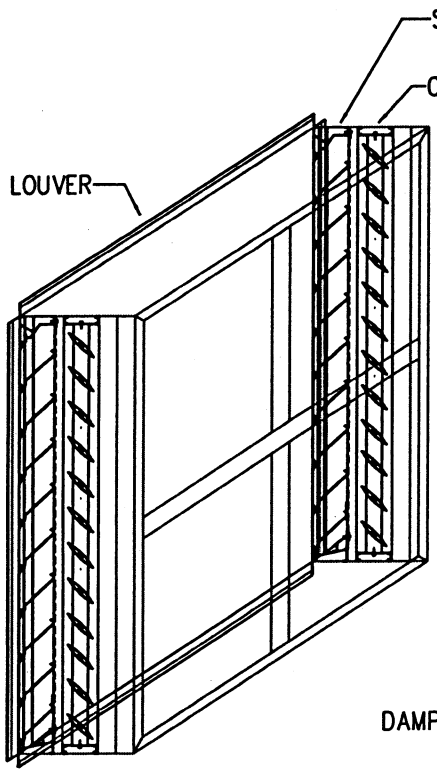
NOT TO SCALE

NOTE: THIS DETAIL IS GENERIC IN NATURE
MODIFY MEASUREMENTS TO FIT FIELD CONDITIONS

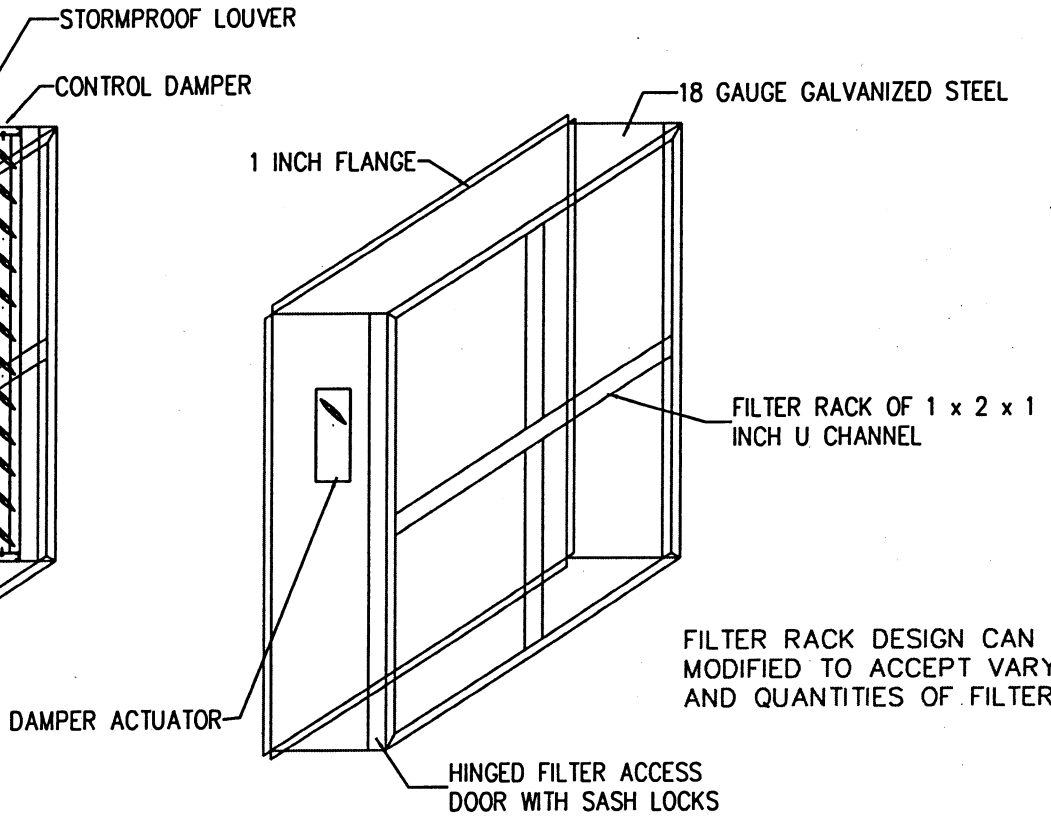
...\FANSPT.dwg 01/30/2007 11:16:29 AM

Item #5

FIELD VERIFY ALL MEASUREMENTS



AIR INTAKE



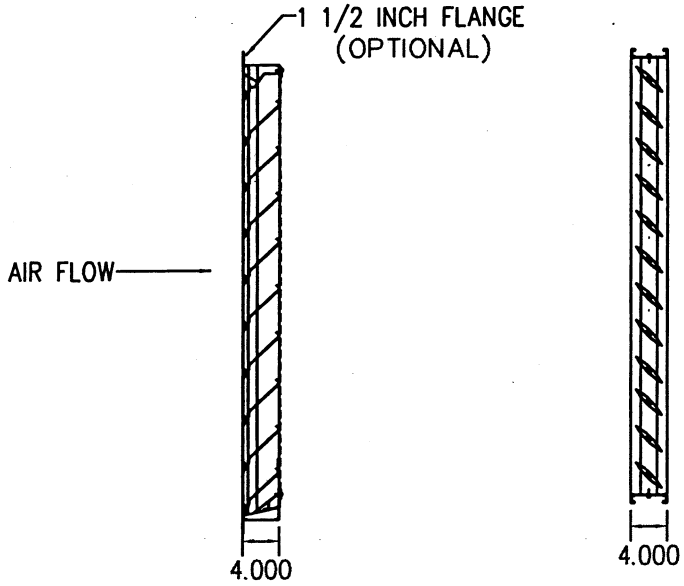
FILTER RACK DESIGN CAN BE MODIFIED TO ACCEPT VARYING SIZES AND QUANTITIES OF FILTERS.

WALL SLEEVE

...\Air Intake No 2.dwg 10/16/2006 03:27:54 PM

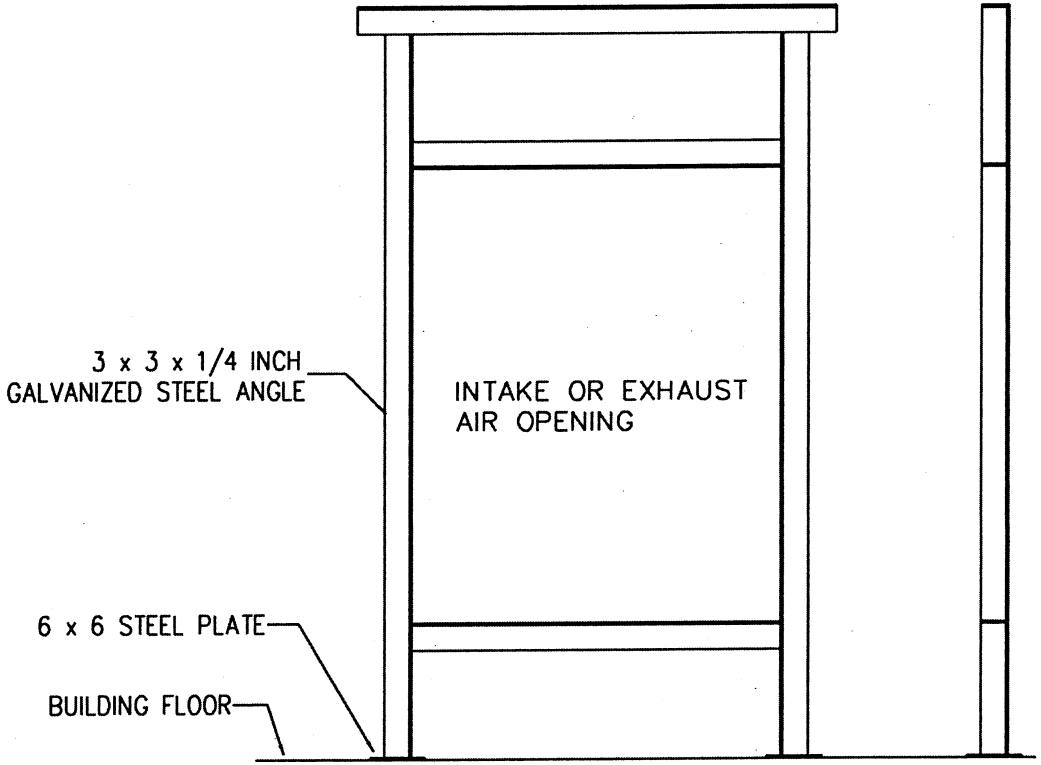
ITEM #6

FIELD VERIFY ALL MEASUREMENTS



INTAKE LOUVER

CONTROL DAMPER



WALL SLEEVE SUPPORT DETAIL

...\Air Intake No 2.dwg 10/16/2006 02:58:30 PM

3/16/06

E/G Replacement ITEM 7

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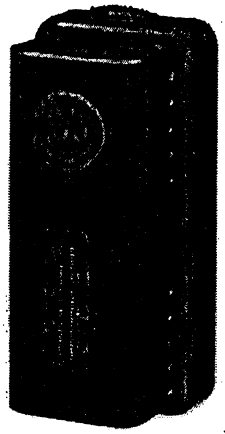
LINE VOLTAGE THERMOSTATS



151-6

LINE VOLTAGE THERMOSTAT FOR COOLING

Ideally Suited for Accurate, Dependable Control of Line Voltage Devices such as Air Conditioners, Unit Coolers, Display Cases, Walk-In Boxes, Room Coolers and Numerous Similar Applications

FEATURES

- Can handle many cooling installations without use of relay or motor starter.
- Heavy gauge steel case – Mounts on vertical 2" x 4" box or flush to wall.
- Hydraulic action element – Unaffected by motion – No leveling required.
- Dustproof case.

SPECIFICATIONS

Dimensions ..... 6"H x 2¾" W x 2½"D
Finish ..... Grey color
Agency ..... U.L. listed and C.S.A. certified

PARTS AND ACCESSORIES

- Thermostat guards – see pages 26-27

Model Number	Range	Differential	Action	Full Electrical Rating	Motor Rating (Full Load)	
					120 VAC	240 VAC
151-6	55 to 95°F (13 to 35°C)	Fixed 2°F (1.0°C)	Close on Rise	FGH See page 162	16.0A	8.0A
151-9	55 to 95°F (13 to 35°C)	Fixed 3.0°F (1.6°C)	SPDT	SPDT See page 162	7.4A	3.7

152-9

LINE VOLTAGE THERMOSTAT FOR HEATING

For Control of Most Line Voltage Heating Applications without use of Relays or Motor Starters

FEATURES

- "Summer" dial position (152 model) that closes contacts to operate unit heater fan.
- Heavy gauge steel case – Mounts on vertical 2" x 4" box or flush to wall.
- Hydraulic action element – Unaffected by motion – No leveling required.
- Dustproof case.

SPECIFICATIONS

Dimensions ..... 6"H x 2¾" W x 2½"D
Finish ..... Grey color
Agency ..... U.L. listed and C.S.A. certified

PARTS AND ACCESSORIES

- Thermostat guards – see pages 26-27

Model Number	Range	Differential	Action	Full Electrical Rating	Motor Rating (Full Load)		Resistive (Non-Inductive)		
					120 VAC	240 VAC	120 VAC	240 VAC	277 VAC
152-9	55 to 85°F (13 to 29°C)	Fixed 2°F (1.0°C)	Open on Rise	FG See page 162	14.0A	7.0A	25.0A	22.0A	18.0A
152-6	55 to 95°F (13 to 35°C)	Fixed 3.0°F (1.6°C)	SPDT	SPDT See page 162	7.4A	3.7	24.0A	20.0A	N/A

Use this one for the unit heater.

2/5

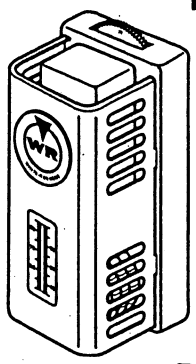
WHITE-RODGERS

TYPE 151
ROOM THERMOSTAT
Cooling Service, External Dial
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION



These room thermostats have been designed for controlling cooling equipment operating on line voltage with heavy electrical loads. They are suitable for operation of unit coolers, room coolers, etc., or any similar refrigeration application requiring a heavy duty room thermostat.

Models are available with various ranges for meeting the needs of almost any application.

PRECAUTIONS

THESE CONTROLS MUST BE INSTALLED BY A QUALIFIED INSTALLER.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

This control has been accurately calibrated at the factory. Any attempt to calibrate this control will void the White-Rodgers warranty.

⚠CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system, at main fuse or circuit breaker box, until installation is complete.

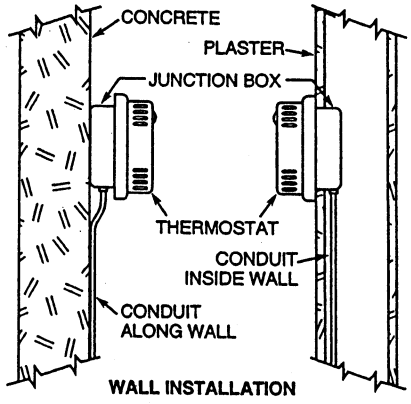
⚠WARNING

Do not use on circuits exceeding specified voltages. Higher voltages will damage control and could cause shock or fire hazard.

INSTALLATION

The proper location of a heavy duty room thermostat is very important to assure good performance. The following general rules will help in determining the proper location:

1. Make sure that it is in a place where air circulates around it freely. This is important.
2. Never install it on or near an outside wall.
3. Keep it away from windows or doors.
4. Don't locate it too close to a strong light or any other false source of heat such as direct sunlight, steam lines, etc.
5. Mount it on a post or a partitioning wall, but make sure that there are no pipes or duct work in that wall or directly behind it.
6. If the electrical conduit leads into a cooler or a warmer room, plug up the space around the wires in the conduit with rock wool.



The mounting plate for this thermostat has two holes 3 9/16" apart for attaching the control on a standard switch box.

Figure 1

EMERSON

WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
9797 REAVIS RD., ST. LOUIS, MO. 63123
(314) 577-1300, FAX (314) 577-1517
9999 HWY. 48, MARKHAM, ONT. L3P 3J3
(905) 475-4653, FAX (905) 475-4625

Printed in U.S.A.

PART NO. 37-1118B
Replaces 37-1118
9548

INSTALLATION CONT.

IMPORTANT

When control is located where ambient temperature is below freezing, choose a control location far enough away from doors and windows so that moisture will not condense on control.

If the thermostat is used with unit coolers, the following suggestions may help. (See Fig. 2).

1. Position "A" is good if it is sufficiently close to the unit cooler so that the return air to the cooler flows over the thermostat.
2. Position "B" is good if it is not necessary to make frequent adjustments of the dial setting.
3. Position "C" is all right if it is sufficiently far from the cooler that air flowing over the thermostat is not much above the average room temperature.
4. In general, position "D" is not advisable because the post may prevent air from circulating over the thermostat.

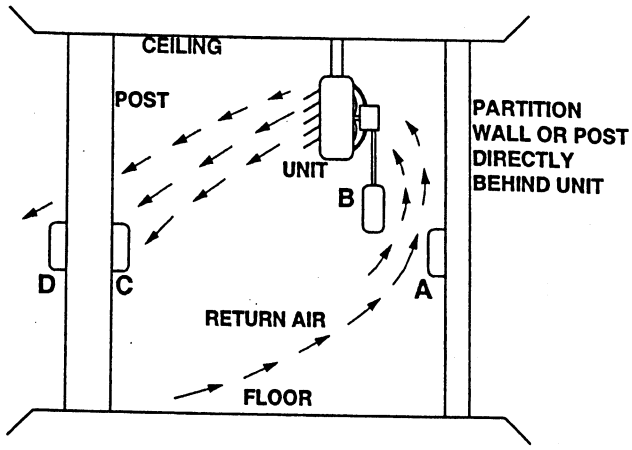
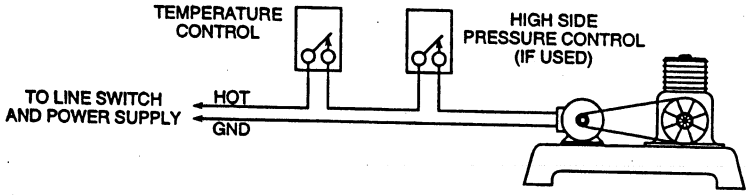


Figure 2

WIRING

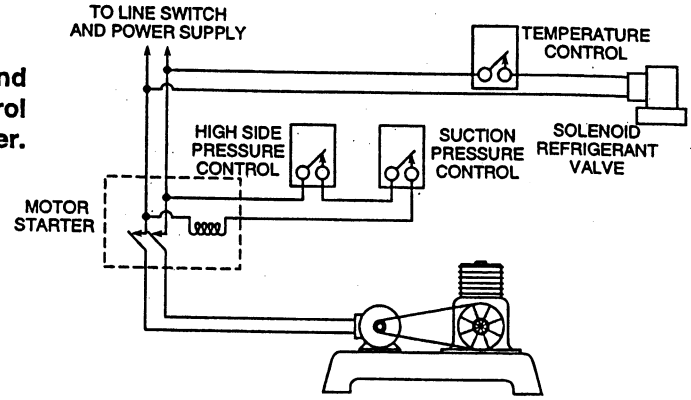
All wiring should be done in accordance with local and national electrical codes and ordinances.

If the manufacturer of the cooling equipment has supplied a wiring diagram, follow the manufacturer's recommendations. The following diagrams show the general use of these controls.



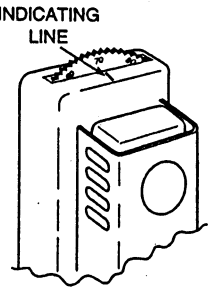
Circuit showing temperature control controlling compressor directly.

Circuit showing temperature control to open and close refrigerant valve. Suction pressure control starts and stops compressor through motor starter.



SETTING THE DIAL

To set the dial, simply move it so that the indicating line on the case points to the temperature at which the contacts are to open as the temperature drops.



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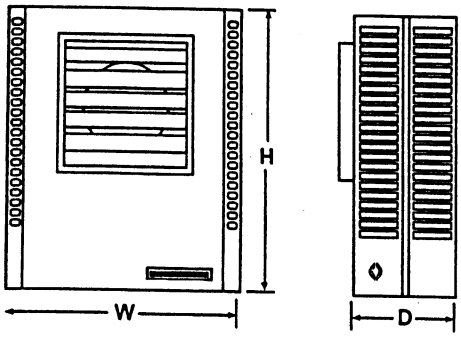
TRANE

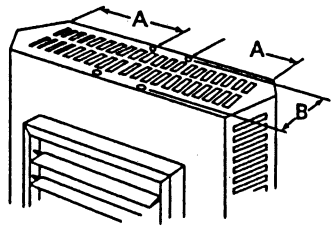
Dimensional Data

Model UHEC

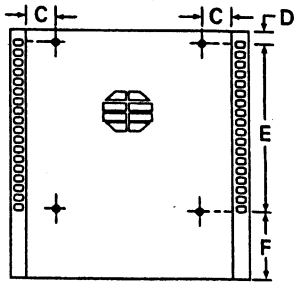
Unit Casing



Horizontal Air Discharge



Vertical Air Discharge



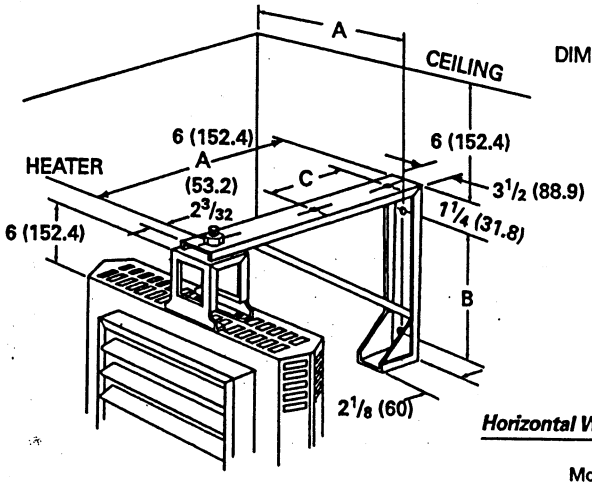
Unit Casing (Inches)

Unit Size	H	W	D
3.3-5	17 3/4 (451)	14 15/32 (368)	6 1/2 (165)
7.5-10	24 5/16 (618)	21 1/2 (546)	6 1/2 (165)
15-20	28 11/16 (729)	21 1/2 (546)	6 1/2 (165)
25-50	34 (864)	29 1/4 (743)	10 1/16 (256)

Weld-Nut Locations in Inches and Millimeters ( )

Unit Size	Horizontal			Vertical		
	A	B	C	D	E	F
3.3-5	3 1/32 (77)	5 1/4 (133)	2 7/16 (62)	1 5/32 (29)	11 5/32 (283)	5 7/16 (138)
7.5-10	7 17/32 (191)	5 1/4 (133)	3 1/2 (89)	1 7/8 (48)	16 1/16 (408)	6 3/8 (162)
15-20	7 17/32 (191)	5 1/4 (133)	3 1/2 (89)	1 7/8 (48)	20 7/16 (519)	6 3/8 (162)
25-50	10 27/32 (275)	8 13/16 (224)	6 13/16 (173)	1 7/8 (48)	26 1/2 (673)	5 5/8 (143)

Horizontal Air Discharge



DIMENSIONS SHOWN IN ( ) ARE IN MILLIMETERS

All dimensions approximate.
Certified prints available on request.

Horizontal Wall/Ceiling Swivel Bracket Clearance Requirements (Inches)

Unit Size	Model Mounting Bracket	Minimum Distance: Ceiling To Unit	Minimum Distance: Adjacent Surface To Unit	Minimum Distance: Floor To Unit*	Mounting Bracket Wt. lbs. (Kg)	Dimensions: A	Dimensions: B	Dimensions: C
3.3-5	A5105	12 (305)	12 (305)	84 (2134)	6 (2.7)	19 15/64 (487)	10 1/2 (267)	9 1/4 (235)
7.5-20	A5120	18 (457)	12 (305)	84 (2134)	9 (4.1)	23 (584)	12 (305)	19 1/8 (486)
25-50	A5150	18 (457)	12 (305)	84 (2134)	11 (5.0)	26 21/32 (677)	13 1/2 (343)	19 7/8 (505)

*Do not exceed unit's maximum mounting height.

Vertical Mounting Bracket Clearance Requirements (Inches)

Unit Size	Model Mounting Bracket	Minimum Distance: Ceiling To Unit	Minimum Distance: Adjacent Surface To Unit	Minimum Distance: Floor To Unit*	Mounting Bracket Wt. lbs. (Kg)	Dimensions: E	Dimensions: F	Dimensions: G
3.3-5	V5105	12 (305)	12 (305)	84 (2134)	9 (4.1)	26 (660)	9 1/8 (232)	18 3/4 (476)
7.5-20	V5120	18 (457)	24 (610)	84 (2134)	13 (5.9)	36 9/16 (929)	13 7/8 (352)	24 1/2 (622)
25-50	V5150	18 (457)	24 (610)	84 (2134)	13 (5.9)	42 (1067)	13 7/8 (352)	28 1/16 (713)

*Do not exceed unit's maximum mounting height.

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TRANE

General Data Model UHEC

Table GD-1 — Model UHEC

Unit Model Number	Capacity kW Rating	Capacity Btu/Hr (000)	Element and Motor Voltage	Element Phase	Std. Control Voltage	Max. Amp Rating	Min. Circuit Fuse Size	Supply Wire Gauge (60°C)	Motor Data Hp	Motor Data Rpm	Air Delivery Data Airflow At Outlet (Cfm)	Air Delivery Data Approx. Air Rise @ Outlet (F)	Air Delivery Data Horiz. Air Throw (Ft)	Rec. Max. Mounting Height (Ft) Horiz.	Rec. Max. Mounting Height (Ft) Vert.
UHEC-031A0C0	3.3	11.2	208	1	208	15.9	20A	12G	1/125	1550	400	26	12	9	9
UHEC-031B0C0	3.3/2.5	11.2/8.5	240/208	1	240/208	13.7/11.9	20A/15A	12GA/14GA	1/125	1550	400	26	12	9	9
UHEC-031AACA	3.3	11.2	208	1	24	15.9	20A	12G	1/125	1550	400	26	12	9	9
UHEC-032A0C0	3.3	11.2	208	1-3	208	15.9/9.2†	20A	12GA	1/125	1550	400	26	12	9	9
UHEC-032B0C0	3.3/2.5	11.2/8.5	240/208	1-3	240/208	13.7/11.9 7.9/6.9†	20A/15A	12GA/14GA	1/125	1550	400	26	12	9	9
UHEC-031C0C0	3.3	11.2	277	1	277	11.9	15A	14GA	1/125	1550	400	26	12	9	9
UHEC-031CACA	3.3	11.2	277	1	24	11.9	15A	14G	1/125	1550	400	26	12	9	9
UHEC-033DACA	3.3	11.2	480	3	24	4.0	15A	14GA	1/125	1550	400	26	12	9	9
UHEC-031BACA	3.3/2.5	11.2/8.5	240/208	1	24	13.7/11.9	20A/15A	12GA/14GA	1/125	1550	400	26	12	9	9
UHEC-032AACA	3.3	11.2	208	1-3	24	15.9/9.2†	20A	12GA	1/125	1550	400	26	12	9	9
UHEC-032BACA	3.3/2.5	11.2/8.5	240/208	1-3	24	13.7/11.9 7.9/6.9†	20A/15A	12GA/14GA	1/125	1550	400	26	12	9	9
UHEC-051A0C0	5.0	17.1	208	1	208	24.1	35A	8GA	1/125	1550	400	40	12	9	9
UHEC-052AACA	5.0	17.1	208	1-3	24	24.1/13.9	35A	8GA	1/125	1550	400	40	12	9	9
UHEC-051B0C0	5.0/3.7	17.1/12.8	240/208	1	240/208	20.9/18.1	30A/25A	10GA/10GA	1/125	1550	400	40	12	9	9
UHEC-052A0C0	5.0	17.1	208	1-3	208	24.1/13.9†	35A	8GA	1/125	1550	400	40	12	9	9
UHEC-052B0C0	5.0/3.7	17.1/12.8	240/208	1-3	240/208	20.9/18.1 12.1/10.4†	30A/25A	10GA/10GA	1/125	1550	400	40	12	9	9
UHEC-052BACA	5.0/3.7	17.1/12.8	240/208	1-3	24	20.9/18.1 12.1/10.4†	30A/25A	10GA/10GA	1/125	1550	400	40	12	9	9
UHEC-051C0C0	5.0	17.1	277	1	277	18.1	25A	10GA	1/125	1550	400	40	12	9	9
UHEC-053DACA	5.0	17.1	480	3	24	6.1	15A	14GA	1/125	1550	400	40	12	9	9
UHEC-051AACA	5.0	17.1	208	1	24	24.1	35A	8GA	1/125	1550	400	40	12	9	9
UHEC-051BACA	5.0/3.7	17.1/12.8	240/208	1	24	20.9/18.1	30A/25A	10GA/10GA	1/125	1550	400	40	12	9	9
UHEC-05ACACA	5.0	17.1	277	1	24	18.1	25A	10GA	1/125	1550	400	40	12	9	9
UHEC-072AACA	7.5	25.6	208	1-3	24	36.1 20.8 20.8†	50A	6GA	1/50	1550	700	34	22	10	12
UHEC-072BACA	7.5/5.6	25.6/19.2	240/208	1-3	24	31.3/27.1 18.1/15.6†	40A/35A	8GA/8GA	1/50	1550	700	34	22	10	12
UHEC-071CACA	7.5	25.6	277	1	24	27.1	35A	8GA	1/50	1550	700	34	22	10	12
UHEC-073DACA	7.5	25.6	480	3	24	9.1	15A	14GA	1/50	1550	700	34	22	10	12
UHEC-102AACA	10.0	34.1	208	1-3	24	47.8/27.7†	60A	4GA	1/50	1550	700	45	22	10	14
UHEC-102BACA	10.0/7.5	34.1/25.6	240/208	1-3	24	42.2/36.1 24/20.8†	60A/50A	4GA/6GA	1/50	1550	700	45	22	10	14
UHEC-101CACA	10.0	34.1	277	1	24	36.1	50A	6GA	1/50	1550	700	45	22	10	14
UHEC-103DACA	10.0	34.1	480	3	24	12.1	20A	12GA	1/50	1550	700	45	22	10	14
UHEC-153AACA	15.0	51.2	208	3	24	41.7	60A	4GA	1/20	1550	1100	43	32	11	20
UHEC-153BACA	15.0/11.2	51.2/38.4	240/208	3	24	36.1/31.3	50A/40A	6GA/6GA	1/20	1550	1100	43	32	11	20
UHEC-153DACA	15.0	51.2	480	3	24	18.1	25A	10GA	1/20	1550	1100	43	32	11	20
UHEC-203BACA	19.7/14.8	67.2/50.5	240/208	3	24	47.8/41.1	70A/60A	4GA/4GA	1/20	1550	1100	57	32	12	18
UHEC-203DACA	20.0	68.3	480	3	24	24.1	35A	8GA	1/20	1550	1100	57	32	12	18
UHEC-253AACA	25.0	85.3	208	3	24	69.5	90A	2GA	1/12	1550	2000/1800	40/44	45	12	22
UHEC-253BACA	25.0/18.7	85.3/64.0	240/208	3	24	60.2/52.1	80A/70A	3GA/4GA	1/12	1550	2000/1800	40/44	45	12	22
UHEC-253DACA	25.0	85.3	480	3	24	30.1	40A	8GA	1/15	1550	2000/1800	40/44	45	12	22
UHEC-303AACA	30.0	102.4	208	3	24	83.4	110A	1GA	1/12	1550	2000/1800	47/53	40	12	20
UHEC-303BACA	30.0/22.5	102.4/76.8	240/208	3	24	72.3/62.5	100A/80A	1GA/3GA	1/12	1550	2000/1800	47/53	40	12	20
UHEC-303DACA	30.0	102.4	480	3	24	36.2	50A	6GA	1/15	1550	2000/1800	47/53	40	12	20
UHEC-403AACA	40.0	136.5	208	3	24	111.2	150A	1/0*	1/4	1550	3100/2800	40/45	55	15	24
UHEC-403BACA	40.0/30.0	136.5/102.4	240/208	3	24	96.4/83.4	125A/110A	1/0/1GA	1/4	1550	3100/2800	40/45	55	15	24
UHEC-403DACA	39.0	133.1	480	3	24	47.0	70A	4GA	1/5	1550	3100/2800	40/45	55	15	24
UHEC-503AACA	50.0	170.6	208	3	24	139.0	175A	2/0*	1/4	1550	3100/2800	51/56	50	15	22
UHEC-503BACA	50.0/37.5	170.6/128.0	240/208	3	24	120.5/104.3	175A/175A	2/0/2/0	1/4	1550	3100/2800	51/56	50	15	22
UHEC-503DACA	50.0	170.6	480	3	24	60.3	80A	3GA	1/5	1550	3100/2800	51/56	50	15	22

Notes:
1. Maximum amp rating indicates single-phase on those units suitable for both single and three-phase.
2. 25 through 50 kW models are wired for two-stage, low voltage control. These units are also equipped with two-speed motors for Hi-Lo fan operation with addition of fan switch option.
3. Dual voltage unit ratings indicate highest voltage performance.
4. 1 kW equals 3,413 BTU.

*Supply wire on these models should have insulation rated 75°C minimum.
† Amp Rating for three-phase operation.

Item 8

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RUSKIN®

AMCA LICENSED
See Page 2

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

CD50 LOW LEAKAGE CONTROL DAMPER

High Performance Extruded Aluminum Airfoil
Class 1A Leakage Rated

APPLICATION

The CD50 is a low leak, extruded aluminum damper designed with airfoil blades for higher velocity and pressure HVAC stystems. It meets the leakage requirements of the International Energy Conservation Code by leaking less than 3 cfm/sq. ft. at 1" of static pressure and is AMCA licensed as a Class 1A damper.

STANDARD CONSTRUCTION

FRAME
5" x 1" x 6063T5 extruded aluminum hat channel with .125" minimum wall thickness (127 x 25 x 3.2). Low profile, 5" x 1/2" (127 x 13) top and bottom frames on dampers 12" (305) high and less. Mounting flanges on both sides of frame.

BLADES
6" (152) wide, 6063T5 heavy gage extruded aluminum, airfoil shape.

SEALS
Ruskiprene blade edge seals and flexible metal compressible jamb seals.

BEARINGS
Molded synthetic.

LINKAGE
Concealed in frame.

AXLES
1/2" (13) plated steel hex.

MAXIMUM SIZE
Single section – 60"w x 72"h (1524 x 1829).
Multiple section assembly – Unlimited size.

MINIMUM SIZE
Single blade – 6"w x 5"h (152 x 127).
Two blades, parallel or opposed action: 6"w x 9"h (152 x 229).

TEMPERATURE LIMITS
-72°F (-58°C) and +275°F (+135°C) .

FEATURES

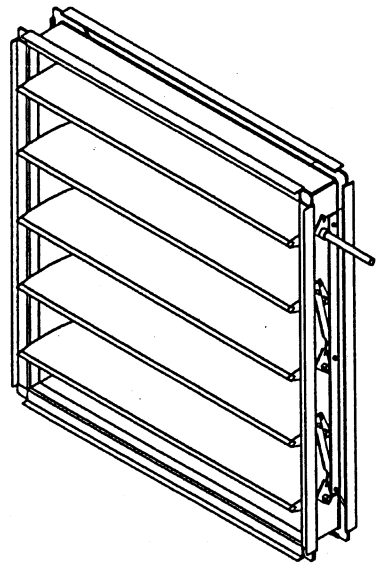
- Airfoil blade design for low pressure drop and less noise generation.
- Positive lock axles, noncorrosive bearings and shake proof linkage for low maintenance operation.
- Blade edge seals mechanically lock into the blade for superior sealing.

OPTIONS

- Factory-installed, pneumatic and electric actuators.
- Enamel and epoxy finishes.
- SP100 Switch Package to remotely indicate damper blade position.
- 16 gage galvanized steel hat channel frame.
- Front, rear or double flange frame with or without bolt holes.
- Face and bypass configurations.

NOTE: Dimensions shown in parenthesis ( ) indicate millimeters.

*Units furnished approximately 1/4" (6) smaller than given opening dimensions.

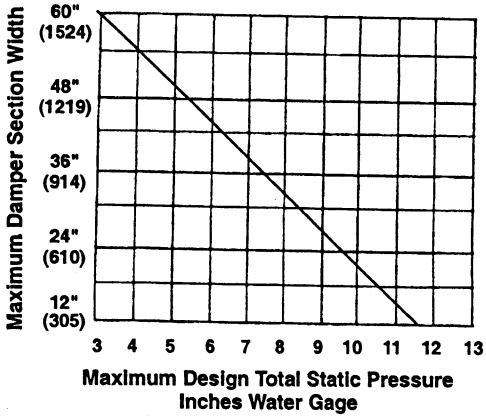


Parallel Blade Design

Qty	Size
2	40"(w) x 50"(h)
1	48"(w) x 48"(h)
9	28"(w) x 75"(h)

CD50 AMCA LICENSED PERFORMANCE DATA

CD50 PRESSURE LIMITATIONS



The CD50 may be used in systems with total pressures exceeding 3.5" by reducing damper section width as indicated. Example: Maximum design total pressure of 8.5" w.g. would require CD50 damper with maximum section width of 36" (914).

Pressure limitations shown above allow maximum blade deflection of 1/180 of span on 60" (1524) damper widths. Deflections in other damper widths (less than 48" [1219]) at higher pressures shown will result in blade deflection substantially less than 1/180 of span.

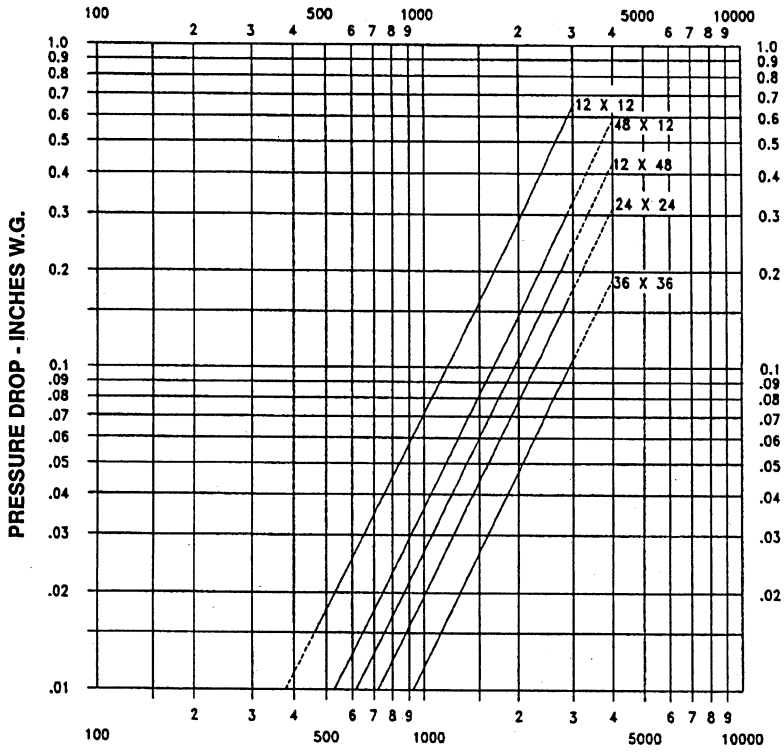
Ruskin Company certifies that the CD50 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA International Certified Ratings Seal applies to Air Performance and Air Leakage.

Pressure Class	Leakage L/s/m² (ft³/min/ft²)			
	Required Rating		Extended Ranges (Opt.)	
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)	12" (3.0 kPa)
1A	3 (15.2)	N/A	N/A	N/A
1	4 (20.3)	8 (40.6)	11 (55.9)	14 (71.1)
2	10 (50.8)	20 (102)	28 (142)	35 (178)
3	40 (203)	80 (406)	112 (569)	140 (711)

DAMPER WIDTH (INCHES)	1 IN. W.G.	4 IN. W.G.	8 IN. W.G.
12" (305)	IA	I	II
24" (610)	IA	I	II
36" (914)	IA	I	NA
48" (1219)	IA	I	NA
60"(1524)	IA	I	NA

Leakage testing conducted in accordance with AMCA Standard 500-D-98. Torque applied holding damper closed, 5 in. lbs./sq. ft. on opposed blade dampers and 7 in. lbs./sq. ft. on parallel blade dampers. Air leakage is based on operation between 50°F to 104°F. All data corrected to represent standard air density 0.075 lbs/ft³.

VELOCITY VS. PRESSURE DROP



FACE VELOCITY - FEET/MINUTE
AMCA FIG. 5.3

CD50 sizes 12 x 12, 24 x 24, 48 x 12, 12 x 48, 36 x 36 (305 x 305, 610 x 610, 1219 x 305, 305 x 1219, 914 x 914)

All data corrected to represent standard air at a density of 0.075 lbs/ft³.

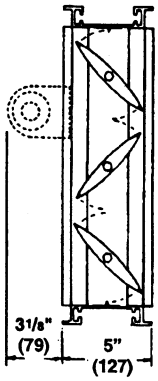
SOUND RATINGS

CD50 SOUND RATINGS

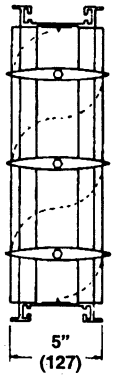
Damper Size	Damper Full Open		Damper 75% Open		Damper 50% Open		Damper 25% Open	
	CFM	NC	CFM	NC	CFM	NC	CFM	NC
12 x 12 (305 x 305)	2000	17	1500	11	1000	11	500	*
	3000	28	2250	22	1500	19	750	*
	4000	35	3000	29	2000	24	1000	*
18 x 18 (457 x 457)	2250	17	1688	10	1125	21	563	*
	4500	33	3375	26	2250	32	1125	*
	6750	43	5063	37	3375	40	1688	15
24 x 24 (610 x 610)	4000	11	3000	10	2000	26	1000	*
	8000	32	6000	30	4000	38	2000	21
	12000	43	9000	42	6000	46	3000	31

NC = Noise criteria in Decibels is based on 10db room effect and 10db of room attenuation.
* = Less than 10 NC
See ASHRAE Handbook (1977 Fundamentals, Chapter 7) for explanation of NC Ratings.

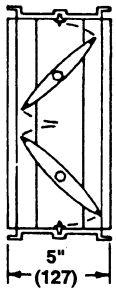
DIMENSIONAL INFORMATION



OPPOSED BLADE



PARALLEL BLADE



LOW PROFILE Standard construction for higher free area on dampers 12" (305) high and less.

CD50 SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans, or in accordance with schedules, Low leakage dampers shall meet the following minimum construction standards: Frames shall be 5" x 1" x .125" (minimum thickness) (127 x 25 x 3.2) 6063T5 extruded aluminum hat channel with hat mounting flanges on both sides of the frame. Each corner shall be reinforced with two die formed internal braces and machine staked for maximum rigidity. Blades shall be airfoil type extruded aluminum (maximum 6" [152] depth) with integral structural reinforcing tube running full length of each blade.

Blade edge seals shall be extruded double edge design with inflatable pocket which enables air pressure from either direction to assist in blade to blade seal off. Blades seals shall be mechanically locked in extruded blade slots, yet shall be easily replaceable in field. Adhesive or clip-on type blade seals are not acceptable. Bearings shall be non-corrosive molded synthetic. Axles shall be hexagonal (round not acceptable) to provide positive locking connection to blades and linkage. Linkage shall be concealed in frame. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Damper shall be tested and licensed in accordance with AMCA 511 for Air Performance and Air Leakage. Damper widths from 12" to 60" (305 to 1524) wide shall not leak any greater than 8 cfm sq. ft. @ 4" w.g. and a maximum of 3 CFM sq. ft. @ 1" w.g. Dampers shall be in all respects equivalent to Ruskin Model CD50.

Item #9
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RUSKIN®

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

EME520DD WIND-DRIVEN RAIN RESISTANT STATIONARY LOUVER
EXTRUDED ALUMINUM

STANDARD CONSTRUCTION

FRAME
5" (127) deep, 6063T5 extruded aluminum with .081" (2.1) nominal wall thickness.

BLADES
6063T5 extruded aluminum .063" (1.6) nominal wall thickness. Double drainable blades are sightproof and spaced approximately 2" (51) center to center.

SCREEN
5/8" x .040" (16 x 1) expanded flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.

FINISH
Mill.

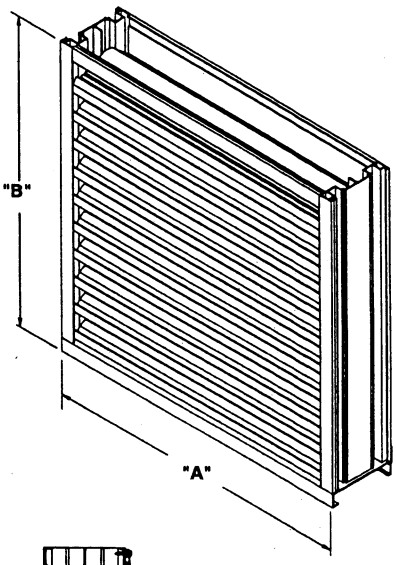
MINIMUM SIZE
12"w x 12"h (305 x 305).

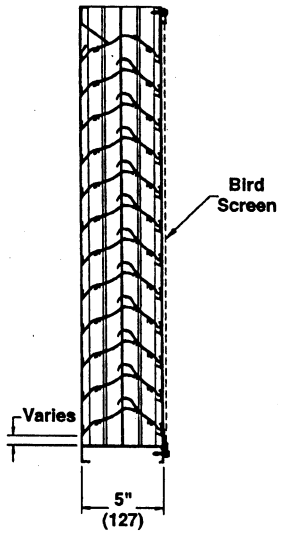
APPROXIMATE SHIPPING WEIGHT
7 lbs. per sq. ft. (34.2 kg/m²)

MAXIMUM FACTORY ASSEMBLY SIZE
Shall be 75 square feet (7m²) per section, not to exceed 120"w x 90"h (3048 x 2286) or 90"w x 120"h (2286 x 3048). Louvers larger than the maximum factory assembly size will require field assembly of smaller sections.

SUPPORTS
Louvers may be provided with rear mounted blade supports that increase overall louver depth depending on louver size, assembly configuration or windload.

Consult Ruskin for additional information.





FEATURES

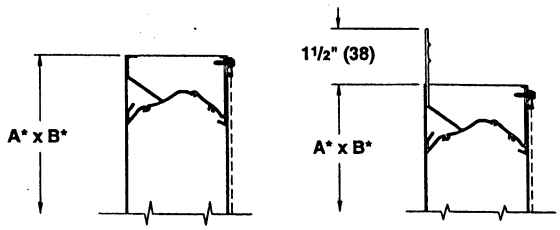
- Closely spaced horizontal blades prevent the penetration of wind-driven rain, reducing damage and additional operating expenses.
- Tested in the AMCA 500-L Wind-Driven Rain Penetration Test.
- Published performance ratings based on testing in accordance with AMCA Publication 511.
- 44% Free Area.
- Excellent pressure drop performance.
- Aluminum construction for low maintenance and high resistance to corrosion.

VARIATIONS

- Extended sill.
- Hinged frame.
- Front or rear security bars.
- Filter racks.
- Installation angles.
- A variety of bird and insect screens.
- Selection of finishes: prime coat, baked enamel (modified fluoropolymer), epoxy, Pearledize 50 & 70, Kynar, clear and color anodize. (Some variation in anodize color consistency is possible).

Consult Ruskin for other special requirements.

FRAME CONSTRUCTION



STANDARD — INTEGRAL FLANGE

Dimensions in inches, parenthesis ( ) indicate millimeters.

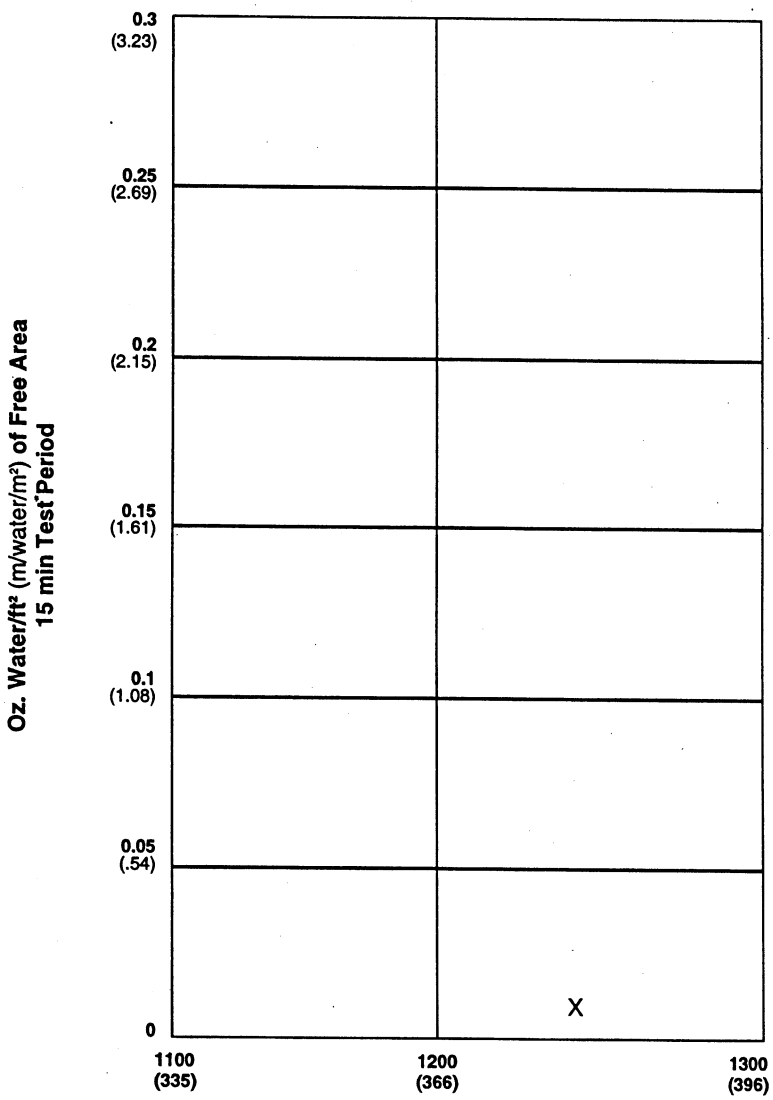
*Units furnished 1/4" (6) smaller than given opening dimensions.

TAG	QTY.	SIZE		FRAME	VARIATIONS
		A*-WIDE	B*-HIGH		

PROJECT **LOCATION**
ARCH./ENGR. **CONTRACTOR**
REPRESENTATIVE **DATE**

WATER PENETRATION GRAPH

Test size 48" x 48" (1219 x 1219)
Beginning point of water penetration at .01 oz./sq. ft. is above 1250 fpm (381 m/min.)



Ruskin Company certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings, water penetration ratings and wind driven rain ratings only.

WIND-DRIVEN RAIN PERFORMANCE

Test size is 1m x 1m (39" x 39") core area, 1.04m x 1.12m (41" x 44") nominal. Free Area of test louver is 5.45 ft² (.51m²).

Wind Velocity mph (Kph)	Rain Fall Rate in/hr (mm/hr)	Core Velocity fpm (m/s)	Airflow cfm (m³/min)	Free Area Velocity fpm (m/sec.)	Effectiveness Ratio	Class 3, 4	Discharge Loss Class 5 Intake
29 (46.4)	3 (76)	672 (3.5)	7236 (204)	1327 (6.6)	99.7%	A	2

NOTES

1. Core area is the open area of the louver face (face area less lover frames). Core Velocity is the airflow velocity through the Core Area of the louver (1m x 1m).
2. Free Area of test size is calculated per AMCA standard 500-L.
3. Wind Driven Rain Penetration Classes:

Class	Effectiveness
A	1 to .99
B	0.989 to 0.95
C	0.949 to 0.80
D	Below 0.8

4. The EME520DD provides class A performance at all velocities up to and including 3.5 m/s core velocity.
5. Discharge Loss Coefficient is calculated by dividing a louvers' actual airflow rate vs. a theoretical airflow for the opening. It provides an indication of the louvers' airflow characteristics.

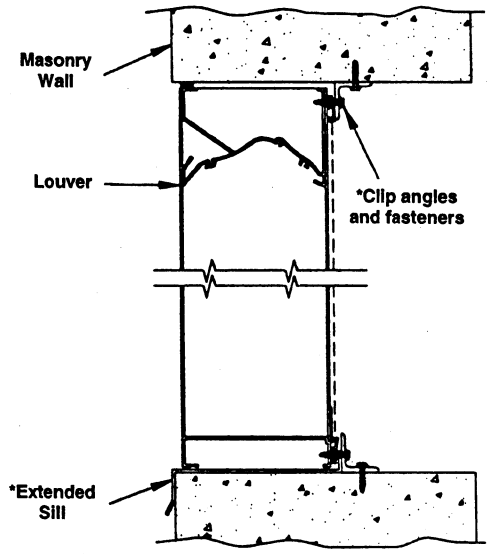
   Discharge Loss Classes:

Class	Discharge Loss Coefficient
1	0.4 and above
2	0.3 to 0.399
3	0.2 to 0.299
4	0.199 and below

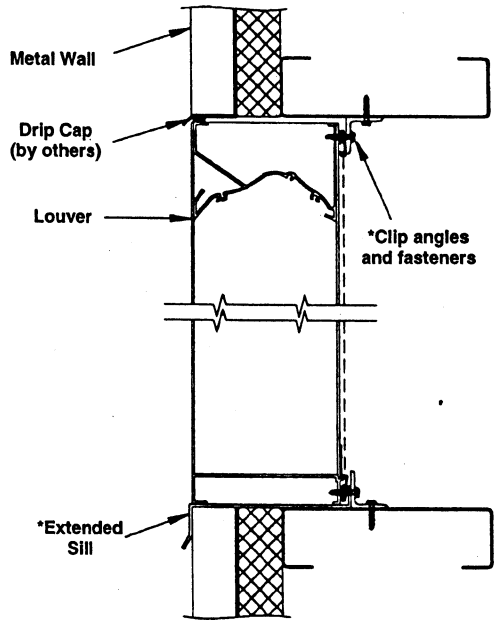
   (The higher the coefficient, the less resistance to airflow.)

TYPICAL INSTALLATION DETAILS

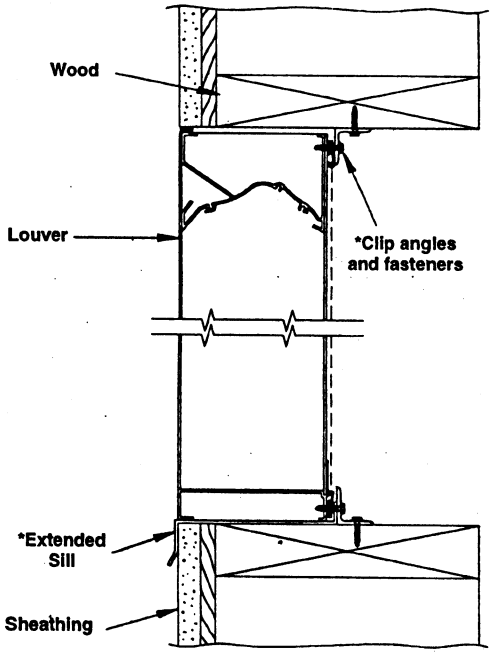
Masonry Wall



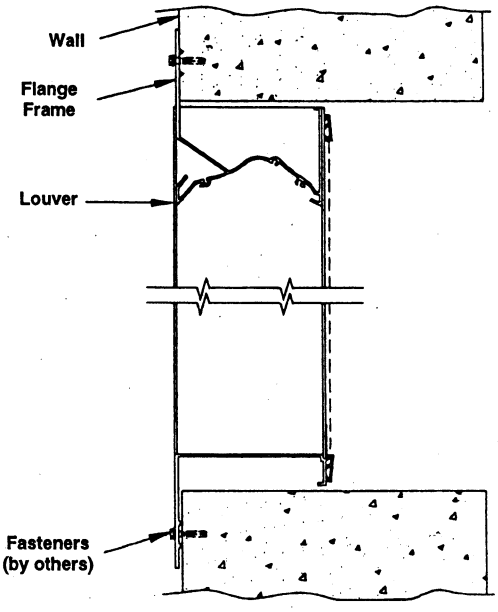
Metal Panel Wall



Wood Installation



Flange Mount



Accessories identified by an "*" may be provided by Ruskin at additional cost.

RUSKIN®

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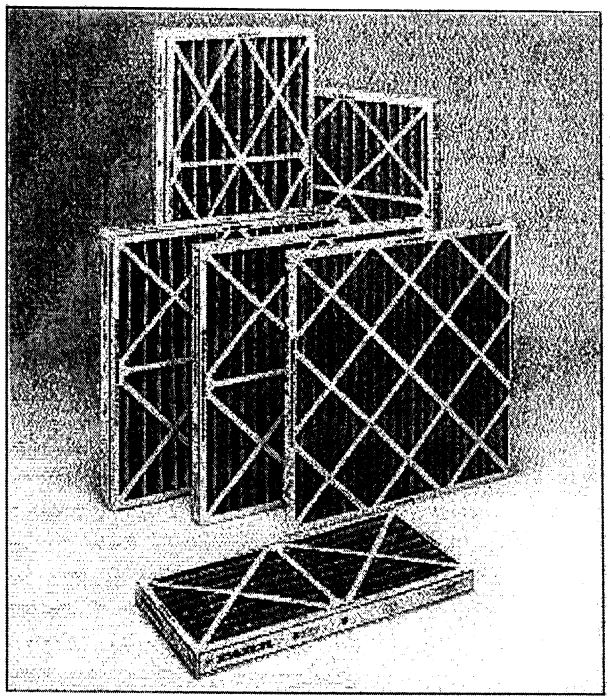
www.ruskin.com

Item #10

FARR AEROPLEAT III Medium Efficiency Pleated Filters

Extended Service Life & Economy In A Disposable Filter

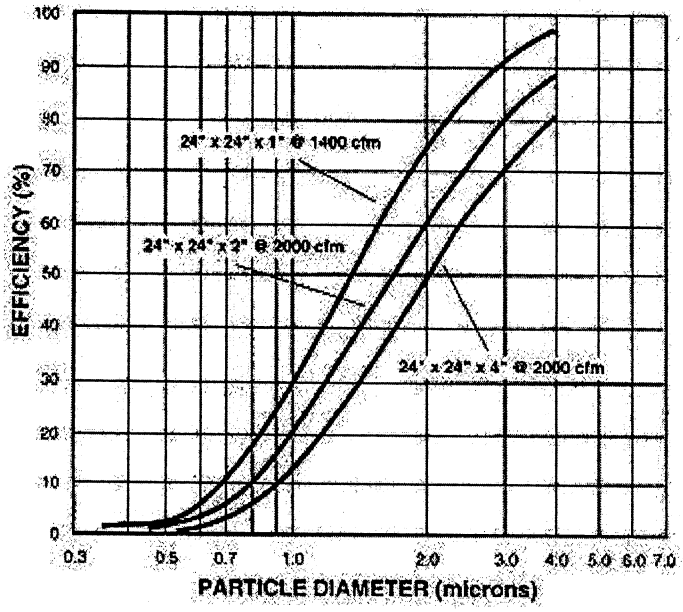
Farr Aeropleat III medium efficiency air filters are the ideal choice where economy and extended service life are important. These disposable pleated filters eliminate the problems associated with flat pads and other throwaway filters. Available in 1", 2" and 4" nominal depths, they may be used alone or as pre-filters to extend the life of high efficiency filters. The Aeropleat III fits most holding frames and side access housings.

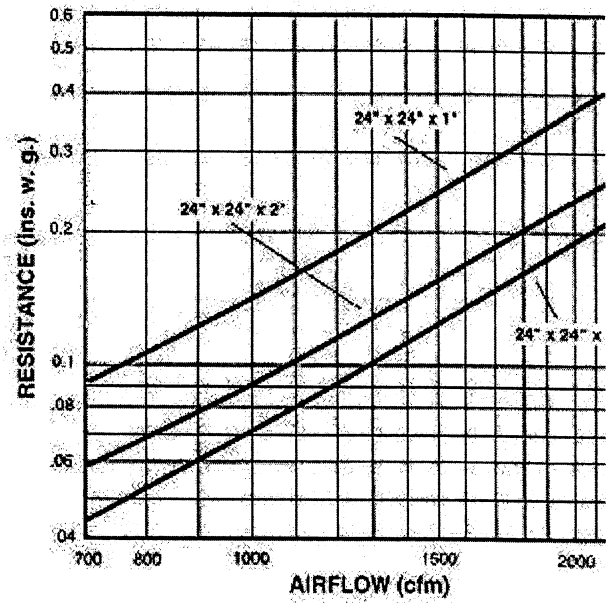


Aeropleat III filters use an exclusive lofted, high performance, non-woven, reinforced cotton and synthetic media. The fabric is fully supported for strength and stability, and is bonded to a welded wire grid to minimize media oscillation. The radial pleat design assures total usage of the filter media and maximum dust holding capacity.

Special construction features contribute to overall performance. Stabilizer face grids are bonded to each pleat on the front and back of the filter for strength and pleat stabilization. A double-wall enclosing frame adds rigidity. the media is bonded to the frame on all four sides to eliminate air bypass.

PERFORMANCE





SPECIFICATIONS

AIR FILTERS - Air filters shall be Farr Aeropleat III, medium efficiency, pleated, disposable type. Each filter shall consist of a non-woven cotton and synthetic fabric media support grid and enclosing frame. The filter shall be listed by Underwriter's Laboratories as Class 2.

FILTER MEDIA - Filter media shall be non-woven cotton fabric type. The filter media shall have an average efficiency of 25-30% on ASHRAE Test Standard 52.1-92.

1 INCH - Filter face shall contain not less than 12 pleats per linear foot. Initial resistance at 500 fpm shall not exceed 0.22" w.g.

2 INCH - Filter face shall contain not less than 10 pleats per linear foot. Initial resistance at 500 fpm shall not exceed 0.23" w.g.

4 INCH - Filter face shall contain not less than 9 pleats per linear foot. Initial resistance at 500 fpm shall not exceed 0.19" w.g.

MEDIA SUPPORT GRID - The media support grid shall be a welded wire grid with an effective open area of not less than 96%. The welded wire grid shall be bonded to the filter media to eliminate the possibility of media oscillation, media pull away, and air bypass.
The media support grid shall be formed in such a manner that it effects a radial pleat design, allowing total use of filter media.

ENCLOSING FRAME - The enclosing frame shall be constructed of a rigid, heavy-duty board, with diagonal support members bonded to the air entering side of each pleat, to ensure pleat stability. The inside periphery of the enclosing frame shall be bonded to the filter pack, thus eliminating the possibility of air bypass.

**The Farr Aeropleat III is categorized as a 30% efficiency filter. Average efficiencies may vary 5 points. These variances are typical of filters in the medium efficiency category when tested in accordance with the ASHRAE 52.1-92 standard.*

ORDERING INFORMATION

NOMINAL FILTER DEPTH	NOMINAL SIZE (Inches)	FARR ORDERING NUMBER	ACTUAL SIZE (Inches)			CAPACITIES (cfm)		RESISTANCE @ CAPACITY ‡ (Inches w.g.)			MEDIA AREA (square feet)	
			HEIGHT	WIDTH	DEPTH	MEDIUM	HIGH	MEDIUM	HIGH	FINAL*	TOTAL	Media Area per Sq. Ft. of Face Area
1"	20 x 10 x 1	119303-001	19.50	15.50	.75	383	766	.09	.22	1.0	3.8	1.7 12 pleats per linear foot
	20 x 20 x 1	119303-002	19.50	19.50	.75	482	964	.09	.22	1.0	4.8	
	25 x 20 x 1	119303-005	24.50	19.50	.75	605	1215	.09	.22	1.0	6.0	
	25 x 16 x 1	119303-004	24.50	15.50	.75	481	962	.09	.22	1.0	4.8	
	24 x 24 x 1	119303-005	23.50	23.50	.75	700	1400	.09	.22	1.0	6.9	
	20 x 14 x 1	119303-006	19.50	13.50	.75	334	668	.09	.22	1.0	3.3	
	20 x 15 x 1	119303-008	19.50	14.50	.75	358	717	.09	.22	1.0	3.6	
	24 x 12 x 1	119303-009	23.50	11.50	.75	342	684	.09	.22	1.0	3.4	
	35 x 14 x 1	119303-011	24.50	13.50	.75	419	838	.09	.22	1.0	4.2	
	20 x 10 x 1	119303-012	19.50	9.50	.75	235	470	.09	.22	1.0	2.4	
2"	20 x 16 x 2	116300-001	19.50	15.50	1.75	555	1110	.09	.23	1.0	6.6	3.0 10 pleats per linear foot
	20 x 20 x 2	116300-002	19.50	19.50	1.75	695	1390	.09	.23	1.0	8.6	
	25 x 20 x 2	116300-005	24.50	19.50	1.75	870	1735	.09	.23	1.0	10.7	
	25 x 16 x 2	116300-004	24.50	15.50	1.75	695	1390	.09	.23	1.0	8.2	
	24 x 24 x 2	116300-005	23.38	23.38	1.75	1000	2000	.09	.23	1.0	12.1	
	24 x 12 x 2	116300-006	23.38	11.38	1.75	487	974	.09	.23	1.0	6.0	
	24 x 20 x 2	116300-007	23.50	19.50	1.75	835	1670	.09	.23	1.0	10.3	
	24 x 18 x 2	116300-008	23.50	17.50	1.75	750	1500	.09	.23	1.0	9.1	
	20 x 14 x 2	116300-010	19.50	13.50	1.75	482	964	.09	.23	1.0	6.0	
	35 x 14 x 2	116300-011	24.50	13.50	1.75	605	1210	.09	.23	1.0	7.6	
4"	24 x 24 x 4	116307-001	23.38	23.38	3.75	1000	2000	.07	.19	1.0	17.6	5.7 9 pleats per linear foot
	24 x 12 x 4	116307-002	23.38	11.38	3.75	500	1000	.07	.19	1.0	8.8	
	20 x 20 x 4	116307-003	19.38	19.38	3.75	687	1374	.07	.19	1.0	12.6	
	20 x 16 x 4	116307-004	19.38	15.38	3.75	545	1090	.07	.19	1.0	9.4	
	25 x 16 x 4	116307-005	24.38	15.38	3.75	686	1372	.07	.19	1.0	11.8	
	25 x 20 x 4	116307-006	24.38	19.38	3.75	864	1628	.07	.19	1.0	15.7	
	24 x 20 x 4	116307-007	23.38	19.38	3.75	828	1656	.07	.19	1.0	15.1	
	24 x 18 x 4	116307-009	23.38	17.38	3.75	745	1486	.07	.19	1.0	13.9	

‡ 4" and 2" filters are rated at 250 fpm (medium) and 500 fpm (high). 1" filters are rated at 175 fpm (medium) and 350 fpm (high).
** Recommended final resistance. System design may dictate a lower change-out point.*

Farr Company has a policy of uninterrupted research, development and product improvement and reserves the right to change design and specifications without notice.

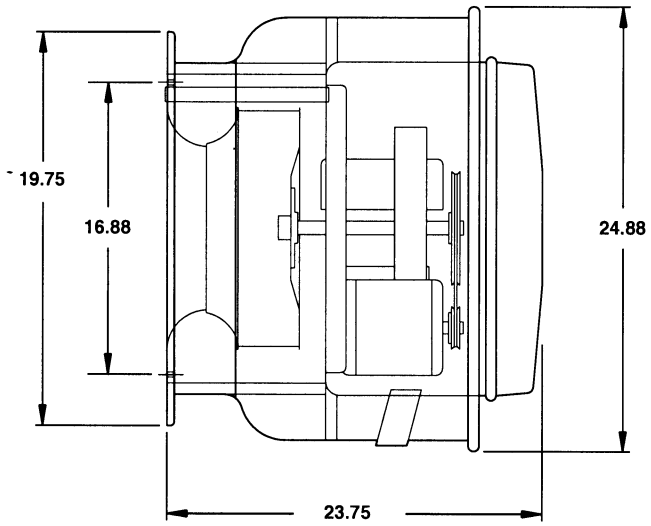
ITEM 11

GREENHECK
Building Value in Air.

Printed Date: 3/12/2007
Job: Wichita AML
Product Type: Fan
Mark: Mark 2

CWB

Belt Drive Centrifugal Sidewall Exhaust Fan



Tag: Mark 2

STANDARD CONSTRUCTION FEATURES

• Aluminum housing • Backward inclined aluminum wheel • Birdscreen mounted to the discharge perimeter • Removable mounting plate • Ball bearing motors • Motor and drives isolated on shock mounts • Adjustable motor pulley • Adjustable motor plate • Fan shaft mounted in ball bearing pillow blocks • Bearing meet or exceed temperature rating of fan • Static free belts • Corrosion resistant fasteners

SELECTED OPTIONS & ACCESSORIES

Switch - Nema-1, Toggle, Junction Box Mounted and Wired
Damper WD-323-PB-12x12, Gravity Operated
Aluminum Birdscreen
Wall Grille
Stainless Steel Shaft
Stainless Steel Fasteners
Hood Hasps (Padlocks by others)
Motor w/ Thermal Overloads

NOTES: All dimensions shown are in units of inches
Fan weight is without accessories

DIMENSIONS

Approx. Fan Weight (lb)	Recommended Roof/Wall Opening: (in)	Optional Damper (in)
58	12.5 x 12.5	12 x 12

PERFORMANCE (Elevation ft = 817, Airstream Temperature F = 70)

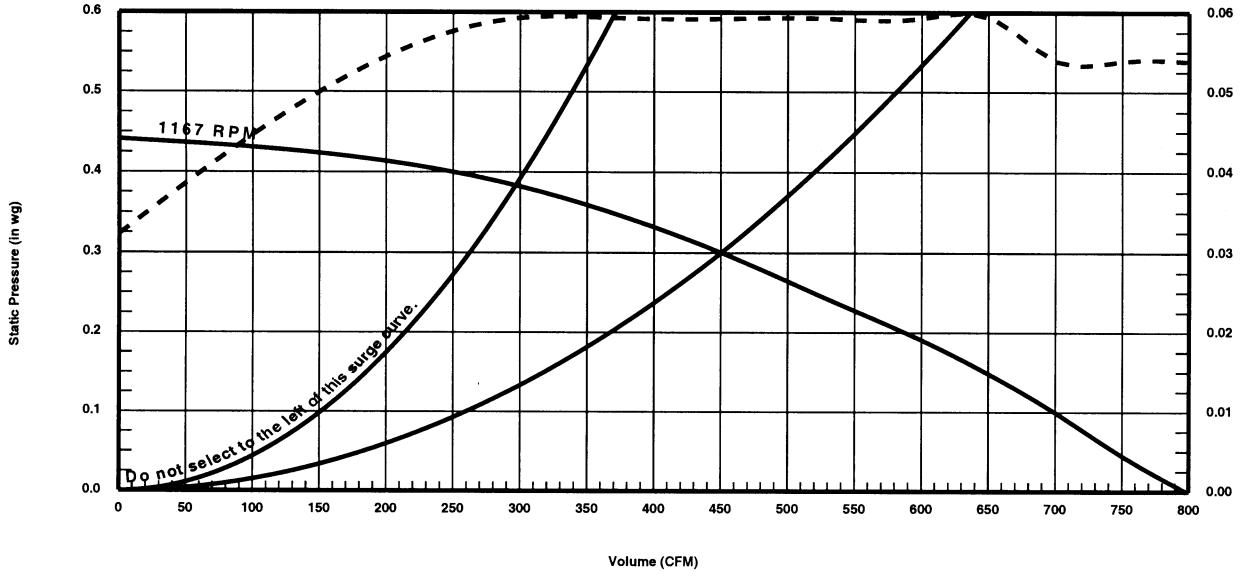
Qty	Model	Volume (CFM)	SP (in wg)	FRPM	Operating Power (hp)	Motor Information					
						Size (hp)	V/C/P	Encl:	Motor RPM:	Windings	FLA (A)
1	CWB-098-4	450	0.3	1,167	0.06	1/4	230/60/1	ODP	1725	1	2.9

FLA - Based on tables 150 or 148 of National Electrical Code 2002.

SOUND

Inlet Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
75	76	71	64	62	51	47	46	68	57	8.2

LwA - A weighted sound power level, based on ANSI S1.4.
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5.0 ft. Sones calculated using AMCA 301 at 5.0 ft.



amca CERTIFIED RATINGS SOUND AND AIR PERFORMANCE
AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

ITem #12 1/2

RUSKIN ABAR120 (-S) Spring return direct coupled air damper actuators

On-off, spring return safety, 120 VAC

Torque min. 133 in-lb, for control of air dampers

Application:
For on-off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is on-off from an auxiliary contact, or a manual switch.

The actuator is mounted directly to a damper shaft up to 1/2" in diameter by means of its universal clamp, or up to a 1.05" jackshaft by removing the clamp insert. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

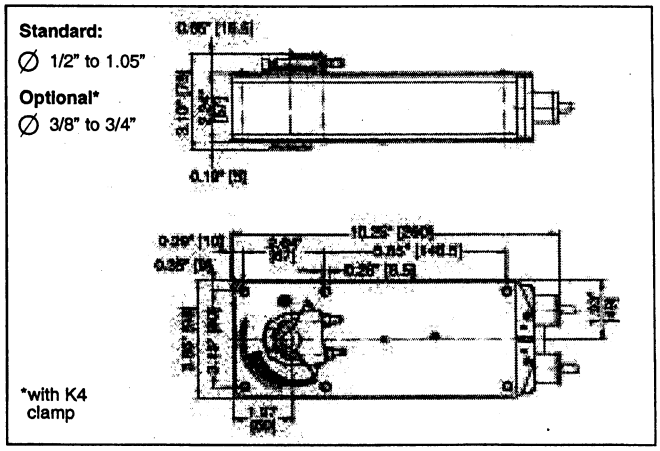
Operation
The ABAR series actuators provide true spring return operation for reliable fail-safe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The ABAR series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

The ABAR...(-S) versions are provided with 1 built in auxiliary switch. This SPDT switch is provided for safety interfacing or signaling, for example, for fan start-up. The switching function is adjustable between 5° and 85°.

The ABAR uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

Technical Data	ABAR120 (-S)
Power supply	120 VAC ± 10% 50/60 Hz
Power consumption	running: 6 W holding: 2.3 W
Transformer sizing	10 VA
Electrical connection	3', 18 GA appliance cable 1/2" conduit connector
Overload protection	electronic throughout 0 to 95° rotation
Angle of rotation	95°, adjustable 30 to 95° w/ accessories
Torque	133 in-lb [15 Nm] constant
Direction of rotation	spring return can be selected by CW/CCW mounting
Position indication	visual indicator, -0° to 95° (-0° is spring return position)
Auxiliary switches (ABAR120-S)	1 x SPDT 7A (2.5A) @ 250 VAC, UL listed adjustable 5° to 85° 18 GA appliance cable
Running time	150 sec. constant, independent of load, spring return < 20 sec
Humidity	5 to 95% RH noncondensing
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA type 2 / IP54
Housing material	zinc coated steel
Agency listings	UL 873 listed, CSA 4813 02 certified
Noise level	max. 45 dB (A)
Servicing	maintenance free
Quality standard	ISO 9001
Weight	6.9 lbs (3.1 kg.)

Dimensions (All numbers in brackets are metric.)

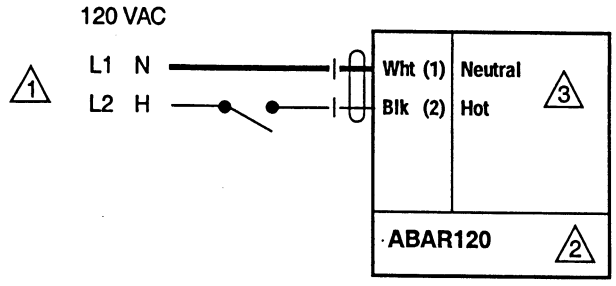


ABAR120 (-S) Spring return direct coupled air damper actuators

RUSKIN

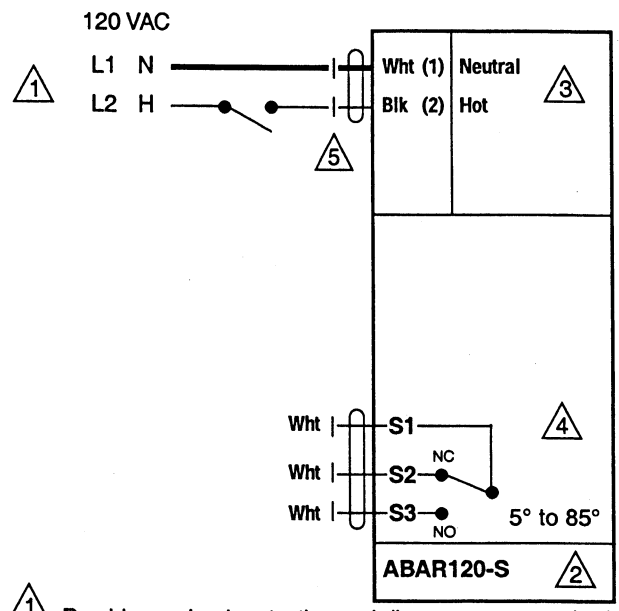
On-off, spring return safety, 120 VAC

Wiring diagrams



1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel. Power consumption must be observed.
3. No ground connection is required.

On-off wiring for ABAR120



1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel. Power consumption must be observed.
3. No ground connection is required.
4. For end position indication, interlock control, fan start-up, etc., ABAR120-S incorporate one built-in auxiliary switch: 1 x SPDT, 7A (2.5A) @250 VAC, UL listed, adjustable 5° to 85°.
5. Meets UL and CSA requirements without the need of an electrical ground connection.

On-off wiring for ABAR120-S